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(54) Enclosures for electrical
 equipment

(57) The invention provides for flameproof, weatherproof enclosures for electrical equipment for use in hazardous areas where inflammable gases or other substances are or may be present in quantities sufficient to produce explosive or ignitable mixtures during normal operation of the electrical equipment. The enclosure (1) which is of sufficient thickness and mechanical strength to withstand the internal ignition of explosive gases comprises a body member (2) sealed

for weather tightness which is provided with a metallic flametrap (3) communicating with the interior of the enclosure and having a replaceable filter element (10) therein of metallic foil or mesh structure to provide for cooling and deionizing products of combustion as they pass through the flametrap (3). The outer end of the flametrap is sealed by a bursting disc (9) of predetermined bursting strength which seals the flametrap against the weather. A translucent portion may be formed in the enclosure.

The filter element (10) may be in the form of alternate planar and crimped strips of metallic foil in face-to-face relation and either folded, stacked or coiled and held together by an annular clamping member.

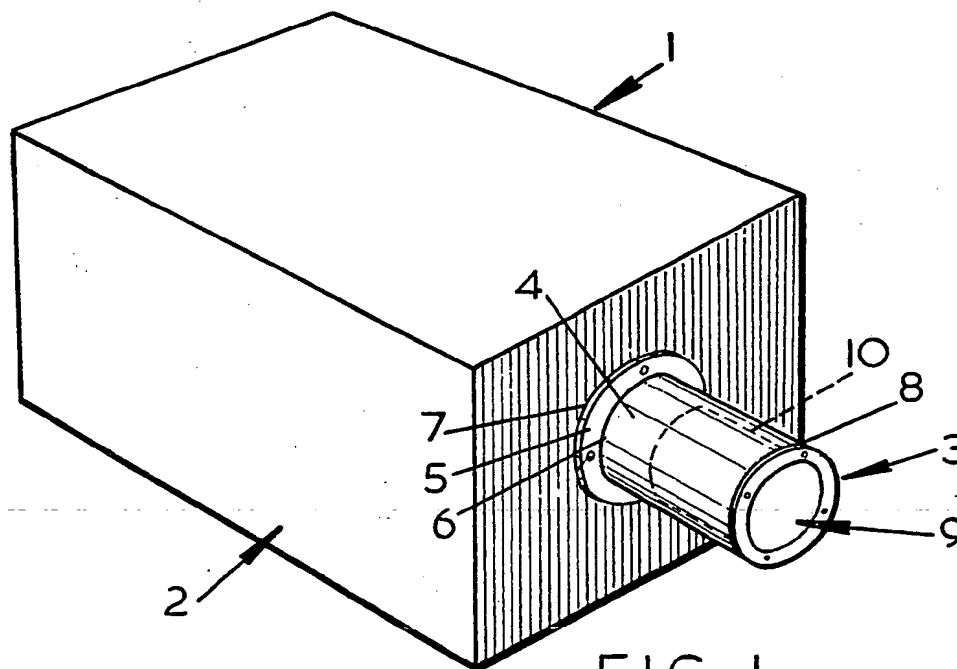


FIG. 1

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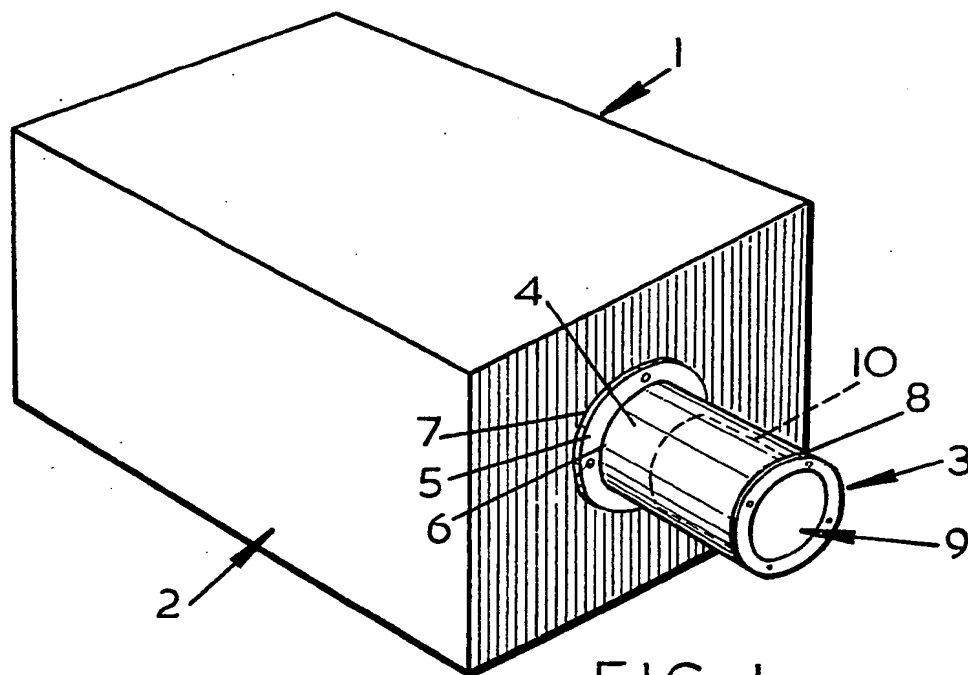


FIG. 1

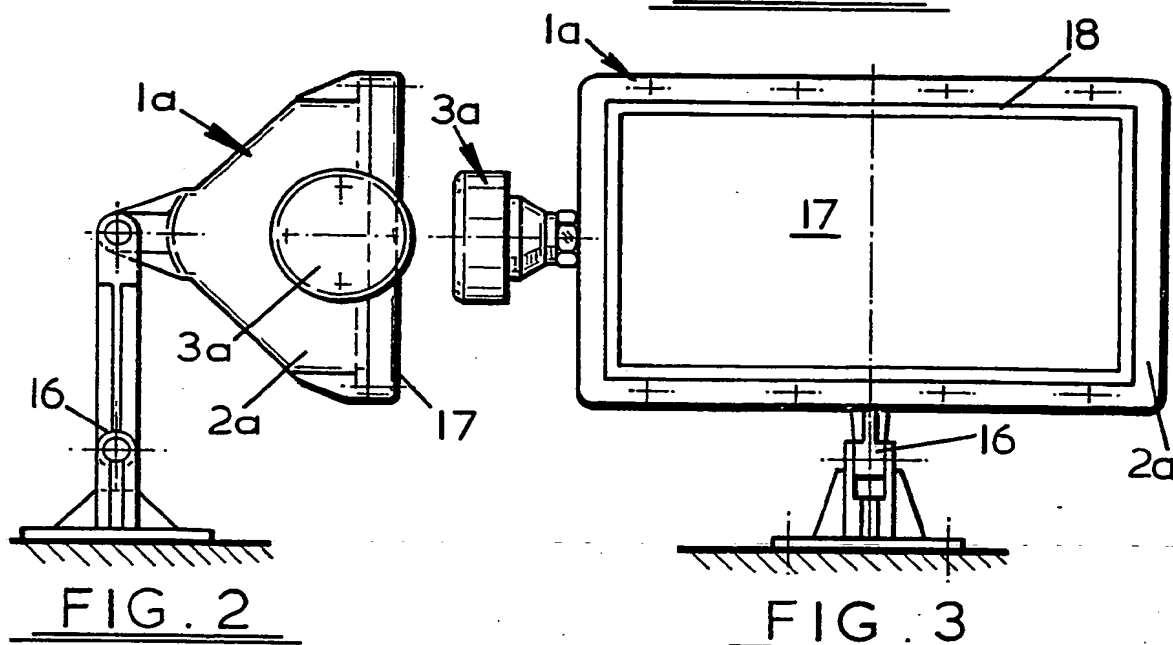
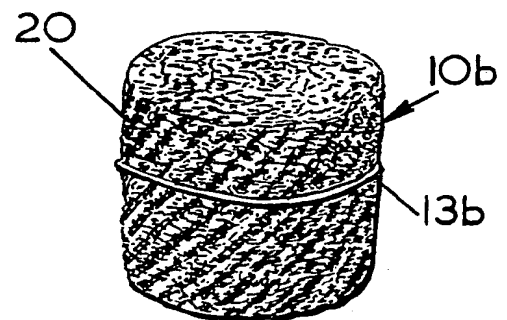
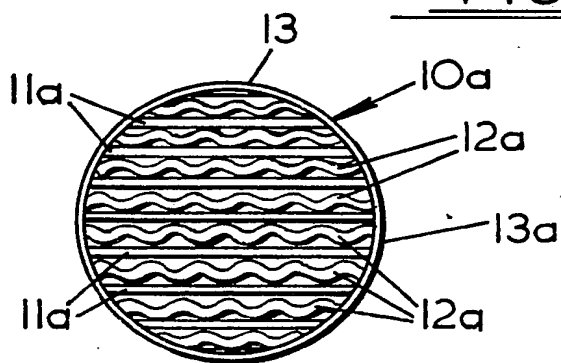
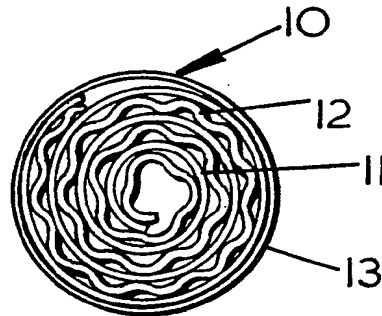
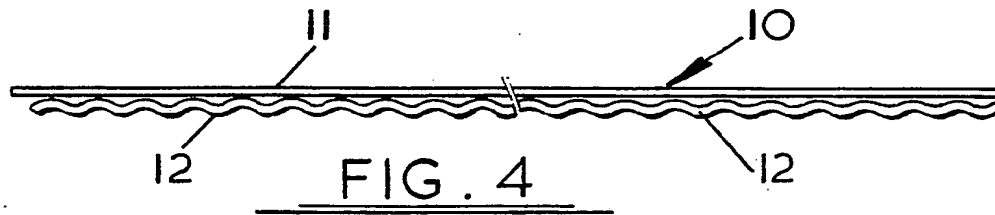


FIG. 2

FIG. 3

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SPECIFICATION

Flameproof, weatherproof enclosures for electrical equipment

5 This invention relates to flameproof, weatherproof enclosures for electrical equipment.

More specifically the invention provides for flameproof and weatherproof enclosures for electrical equipment including lighting fixtures, motors, transformers, switch gear and other electrical equipment, Zone 1 International Electrotechnical Commission Code Symbol Ex'd' and Ex'e', for use in hazardous areas where flammable gases or other substances are or may be present in quantities sufficient to produce explosive or ignitable mixtures during normal operation of the electrical equipment.

According to the invention a flameproof, weatherproof enclosure for electrical equipment comprising a body member of sufficient mechanical strength to withstand the ignition of explosive gases within said body member and sealed for weather tightness, a metallic flametrap communicating at one end with the interior of said body member and sealed at the other end by a disc of predetermined bursting strength to allow immediate operation of the flametrap on ignition of an explosive mixture within the body member a replaceable metallic filter element located in said flametrap, said filter element forming an interlaced cellular structure open in the direction of the ends of the flametrap to cool and deionize products of combustion passing through the flametrap from the interior of the body member.

The body member may be provided with translucent window means and the filter element may be of metallic foil or mesh structure.

Preferred embodiments of the invention are illustrated by way of example in the accompanying drawings in which:-

Fig. 1 illustrates an enclosure for electrical equipment with a flame trap attached thereto according to the invention;

Fig. 2 is a side elevation of an enclosure according to the invention containing electrical lighting fittings and mounted on an adjustable stand;

Fig. 3 is a front elevation of the enclosure of Fig. 2;

Figs. 4 to 7 illustrate several alternative arrangements of filter elements within the flametrap of the enclosures.

Referring to Fig. 1 of the drawings, 1 denotes generally an enclosure for electrical equipment such as electrical motors, lighting fixtures, transformers, switch gear and the like electrical equipment of Zone 1 International Electrochemical Commission Code Symbol Ex'd' and Ex'e' for use in Zone 1 areas (a Zone 1 area being defined as an area where flammable atmospheres are likely to occur in normal operating conditions).

The enclosure 1 may be of any shape or size suitable to accommodate particular electrical equipment and it is sealed against the weather.

The enclosure 1 is so constructed as to be of sufficient thickness and mechanical strength as to withstand an internal explosion caused by the presence of flammable gases or other substances within the enclosure in sufficient quantities to produce an ignitable mixture or explosion during normal operation of the electrical equipment.

65 The enclosure 1 is formed by a body member 2 and a flametrap denoted generally at 3.

70 The body member 2 may be fabricated or cast in metal or moulded from reinforced polymeric plastics material and may be provided with a cover member or access panel to provide access to the interior of the enclosure and the electrical equipment therein.

75 Means may also be provided on the enclosure 1 for attachment to or access for conduits, cables or the like for actuation of the electrical equipment or fittings located within the enclosure.

The cover member or any access when provided are sealed to the body member by gaskets or the like to ensure that the enclosure is weatherproof and capable of containing an explosion or flame ignited within the enclosure and preventing its propagation externally of the enclosure.

85 The flametrap 3 provides for expanded gases or products of combustion within the enclosure to be cooled and deionized as they escape from the enclosure to atmosphere.

The flametrap 3 is formed by a hollow metallic casing 4 connected to the body member 2 as by bolts passing through a flange 5 at one end 6 of the casing 4 which is open to provide access and communication between the interior of the flametrap 3 and the interior of the body member 2. The flange 5 is provided with a gasket 7 to seal the casing to the body member. Alternatively the casing 4 may be integrally formed with the body member 2.

The opposite end, which is the outer end of the flametrap 3 is open and sealed by a replaceable bursting disc 9, which may be of metal, plastics or other suitable material, and which is peripherally secured to the outer end of the flametrap between a flange 8 on the flametrap and an annular member 8a clamped to the flange 8.

105 The bursting disc 9 may be in the form of a metallic disc with a complementary sealing membrane in face-to-face relation having a predetermined bursting strength to ensure that it will burst outwardly immediately a predetermined increased pressure within the enclosure is caused by ignition of an explosive mixture so as to allow immediate operation of the flametrap to exhaust the products of combustion from the enclosure to atmosphere after they have passed through the flametrap to be cooled and deionized.

115 The bursting disc 9 also provides for weatherproofing the flametrap.

A filter element 10, which is replaceable, is located within the flametrap 3 and provides for cooling and deionizing products of combustion passing through the flametrap from the interior of the body member 2.

120 The filter element 10 comprises a metallic foil or mesh which may be made of cupro nickel, stainless

The drawing(s) originally filed was/were informal and the print here reproduced is taken from a later filed formal copy.

steel, aluminium, copper or other suitable metal having heat absorption properties and of sufficient mechanical strength to withstand the explosive gases passing therethrough.

- 5 Preferably the element 10 is constructed from two strips of metallic foil 11, 12 of sufficient thickness and having heat absorption properties to withstand the explosive gases which will pass through it. Once of the strips 11 is planar and the other 12 is crimped
10 and the strips are placed in face-to-face relation and coiled so as to form a spiral circular lattice of cells as illustrated in Fig. 5. The coil is held together by an annular clamping member 13 and the element is inserted into the flametrap which is then sealed by
15 the bursting disc 9.

The filter element 10a (Fig. 6) is formed by stacked alternate planar metallic strips 11a and crimped metallic strips 12a clamped together by an annular band 13a.

- 20 The filter element 10b (Fig. 7) is formed from wire mesh 20 which may be woven or knitted into a strip which is then wound spirally or folded in layers to form a mass of predetermined porosity which is held together by an annular band 13b.

- 25 The filter element is so arranged that a predetermined unrestricted area of lattice is provided open in the direction of the ends of the flametrap. The unrestricted area of lattice or cells being determined by the width and crimp of the foil which is determined
30 by the particular flammable mixture of air and ignitable substance which may pass therethrough.

- The outer end of the flametrap 3 is sealed off by the disc 9 which has a predetermined bursting strength so that on an internal explosion or ignition
35 of gases it would collapse outwards allowing the spent exhaust products of combustion to escape through the flametrap and enter the atmosphere cooled and deionized to such an extent that any external mixture of air and gas or flammable substance present in the atmosphere would not be
40 ignited.

- Figs. 2 and 3 illustrated an enclosure 1a for use with a lighting fitting such as floodlight in which the body member 2a is mounted on an adjustable stand
45 16 and a flametrap 3a is secured to the side of the body member 2a.

- A translucent window portion 17 is provided in the body member to allow light to shine through from a lighting fitting (not shown) located within the body
50 member. The window portion 17 may be of toughened reinforced or moulded glass or plastics material of sufficient strength to withstand explosive gases and it is sealed against the weather as by a gasket 18 located around the edge portion of the
55 window.

Variations in the arrangement of the foils or mesh for the filter element may be made without departing from the scope of the invention.

CLAIMS

- 60 1. A flameproof, weatherproof enclosure for electrical equipment comprising a body member of sufficient mechanical strength to withstand the ignition of explosive gases within said body member and sealed for weather tightness, a metallic flametrap communicating at one end with the interior of
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said body member and sealed at the other end by a disc of predetermined bursting strength to allow immediate operation of the flametrap on ignition of an explosive mixture within the body member, a replaceable metallic filter element located in said flametrap, said filter element forming an interlaced cellular structure open in the direction of the ends of the flametrap to cool and deionize products of combustion passing through the flametrap from the interior of the body member.

2. An enclosure as claimed in claim 1 in which the bursting disc is replaceable and comprises a metallic disc with a complementary sealing membrane in face-to-face relation therewith, said disc and membrane being peripherally secured to the outer end of the flametrap between a flange on the flametrap and an annular ring clamped to the flange.

3. An enclosure as claimed in claim 1 or 2 in which the filter element comprises a planar strip of metallic foil and a crimped strip of metallic foil laid in face-to-face relation and spirally wound to form an interlaced cellular structure, said coil being held together by an annular ring.

4. An enclosure as claimed in claim 1 or 2 in which the filter element comprises a plurality of strips of metallic foil are laid in face-to-face relation each alternate strip being crimped.

5. An enclosure as claimed in claim 1 or 2 in which the filter element is formed from wire mesh of predetermined porosity.

6. An enclosure as claimed in any of the preceding claims in which a translucent portion is formed in the body member.

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